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BIRCH STEWART KOLASCH & BIRCH
8110 GATEHOUSE ROAD
SUITE 500 EAST
FALLS CHURCH VA 22042

EXAMINER	
ZERVIGON,R	
ART UNIT	**PAPER NUMBER**
1763	14

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/905,971	Kazayuki et al
Examiner	**Group Art Unit**
Rudy Zervigon	1763

☒ Responsive to communication(s) filed on *Oct 26, 2000*

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) *1-34* is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-34* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-4, 7-16, 20-25, 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tateishi et al (U.S. Pat. 4,405,435) in view of Mikio Takagi (Pub. No. 2-152251; IDS Paper 6 Document). Tateishi et al describe *a substrate processing apparatus (Figure 4)* where component chambers are each *hermetically* configured (column 1, lines 35-45) and exhibit the following attributes:

i. *a substrate transfer section* embodied by Tateishi et al here as item 52/53, Figure 4 (column 5, lines 40-55)

ii. *a plurality of modules* embodied here by Tateishi et al as *processing chambers for processing substrates* (items 54, Figure 4; column 5, lines 40-55) and *a plurality of modules* embodied by Tateishi et al as *first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) *for processing substrates*.

iii. *first substrate transfer means* embodied by Tateishi et al as item 62 of Figure 2 (column 5, lines 55-68) provided in

iv. a *substrate transfer section* (items 52/53, Figure 2) *capable of transferring a substrate to the plurality of modules*

v. *a first valve (items 64, figure 2; 71, figure 6) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the processing chambers for processing substrates* (items 3, all Figures; column 1, lines 45-50) and *a plurality of modules* embodied by Tateishi et al as *first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) *when the first valve is closed and allowing* a *substrate to pass through when opened*

vi. *a second valve (item 71, figure 4) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) and *a substrate transfer section* embodied by Tateishi et al here as item 52, Figure 2 (column 5, line 53) *when the second valve is closed and allowing* a *substrate to pass through when opened*

vii. *a third valve (item 77, figure 2) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) and *a substrate transfer section* embodied by Tateishi et al here as item 52, Figure 2 (column 5, line 53) *when the third valve is closed and allowing* a *substrate to pass through when opened*

viii. *first and second intermediate processing* or treatment *chambers* additionally are provided with *second substrate transfer means (item 67, Figure 4; column 6, lines 16-30) capable of transferring* a substrate *to a processing* or treatment *chamber.*

ix. all component chambers are each *hermetically* configured (column 2, lines 43-63) *and can be independently reduced in pressure (items 69, 76, 112, 8, Figure 6, column 6, line 33* - 45). Motivation for such design is additionally provided (*column 6, line 33* - 45).

x. *an intermediate chamber (item 52/53, Figure 2)* supporting *substrate holding means (items 65/72, Figure 4) positioned closer to* the *substrate transfer section (items 52, Figure 4) than* the *second substrate transfer means (item 78, Figure 4)*

xi. Tateishi et al describe *cassette holding means accommodating a plurality of substrates (Items 63,68,75; column 5, lines 55-65) where the first substrate transfer means is capable of transferring a substrate between the cassette and plurality of modules.*

xii. Tateishi et al describe a *first substrate transfer means structure capable of transferring* a wafer cassette *(item 67, Figure 4; column 6, lines 16-30).*

xiii. Tateishi et al specifically describe a *cassette introduction section* whose *height is different from the height of the cassette holding means (all Figures).* Tateishi et al describe *processing a plurality of substrates simultaneously*

xiv. Tateishi et al specifically describes transferring and processing a single wafer at a time (Figure 7; column 17, lines 14-21)

Tateishi et al do not expressly describe *modules piled up separately in a substantially vertical direction.* Tateishi et al do not expressly describe varying the number (one or more) of transferred and/or processed substrates.

Mikio Takagi describes a manufacturing system of vertical-type semiconductor (title, JPO abstract). Specifically, Mikio Takagi describes "...a process chamber installed in each stage position of a space positioned in an up-and-down direction..." in order to "..reduce a floor area and to easily install more systems...". Thus the Mikio Takagi reference supports *a substrate processing apparatus hermetically* configured exhibiting *modules piled up separately in a substantially vertical direction.* Mikio Takagi additionally describes all component chambers each *hermetically* configured *and can be independently reduced in pressure (abstract, "Individual process chambers are evacuated in advance to a prescribed pressure by using individual pumps 3").* Mikio Takagi additionally provides for *an elevator capable of vertically moving a first substrate transfer means (items 11, 14; constitution).*Mikio Takagi additionally provides for *an elevator capable of vertically moving a first substrate transfer means (items 11, 14; constitution).* Component chambers are each *hermetically* configured (certified STIC translation, page 5, second paragraph) and exhibit the following attributes:

xv. *a substrate transfer section* embodied by Mikio Takagi here as item 14, Figure 1, (certified STIC translation, page 12, 3rd paragraph)

xvi. *a plurality of detachably* (first paragraph, page 11*) attached modules* (items 14/2/3, Figure 1; certified STIC translation, pages 10-12) and *a plurality of modules* embodied by Mikio Takagi as *processing* or treatment *chambers* (items 2, Figure 1; certified STIC translation, pages 10-12) *for processing substrates.*

xvii. *first substrate transfer means* embodied by Mikio Takagi as item 14 of Figure 1 (certified STIC translation, pages 10-12) provided in

xviii. a *substrate transfer section* (item 14, Figure 1) *capable of transferring a substrate to the plurality of modules*

xix. *a first valve (items 12, figure 1) capable of establishing hermetic* (certified STIC translation, page 5, second paragraph) *isolation between the processing chambers for processing substrates* and *a plurality of modules where the first valve is closed and allowing* a *substrate to pass through when opened* (certified STIC translation, page 12, last paragraph)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tateishi et al *substrate processing apparatus* by implementing the Mikio Takagi *substrate processing apparatus hermetically* configured exhibiting *modules piled up separately in a substantially vertical direction.* Motivation for such design alteration of the Tateishi et al *substrate processing apparatus* is provided by Mikio Takagi. Specifically, "To reduce a floor area and to easily install more systems (..."*modules being detachable attached...*")" which is centered on reducing the clean room foot print in order to reduce operating costs ("Purpose" of IDS document abstract.)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the number (one or more) of transferred and/or processed substrates. Motivation for varying the

number (one or more) of transferred and/or processed substrates is drawn from larger manufacturing throughput of the claimed apparatus. Additionally, MPEP 2114 is pertinent to the present position:

3.MPEP - 2114

Apparatus and Article Claims - Functional Language [R - 1]

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM THE PRIOR ART

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ."(emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

4. Claims 5,6,17,18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tateishi et al (U.S. Pat. 5,186,718) as applied to claims 1-4, 7-16, 20-25 above, and further in view of Hideki Lee (U.S. Pat. 5,616,208). Tateishi et al do not describe processing *substrates under atmospheric pressure* through a *substrate transfer section.* Hideki Lee describes a vacuum processing apparatus including a plurality of vacuum processing chambers (column 9, lines 19-34). Specifically, Hideki Lee describes processing *substrates* serially and *under atmospheric pressure (column 10, lines 32-42)* through a *substrate transfer section (items 20, 21, Figure 8).* Additionally, Hideki Lee (column

5, lines 1-14), describes processing substrates in a *substrate processing chamber (items 1,2, and 3, Figure 8) under reduced pressure (column 9, line 24).*

It is the examiner's position that a person of ordinary skill in the art at the time the invention was made would have found it obvious to modify the Tateishi et al multichamber processing apparatus whereby substrates are transferred through a *substrate transfer section (items 20, 21, Figure 8)* while sustaining atmospheric pressure as is taught by Hideki Lee. Motivation for processing substrates that are transferred through a *substrate transfer section (items 20, 21, Figure 8)* while sustaining atmospheric pressure during the transfer is centered on selecting where, in the processing of the substrate, the reactant gas will be introduced. Such selection is within the independent pressure control as exhibited by the references and encompassed within the level of ordinary skill in view of the cited references.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tateishi et al (U.S. Pat. 5,186,718) as applied to claims 1-4, 7-16, 22 above, and further in view of Shunpei Yamazaki (U.S. Pat. 4,582,720). Tateishi et al describe an *intermediate chamber (item 24, Figure 1)* supporting *substrate holding means (item 40, Figure 1) positioned closer to* the *substrate transfer section (items 21, Figure 1) than* the *second substrate transfer means (item 42, Figure 1,2,3a,3b,4a,4b).* However, Tateishi et al does not specifically describe an *intermediate chamber* supporting *heat-resistant substrate holding means positioned closer to* the *substrate transfer section than* the *second substrate transfer means.* Because the Tateishi et al apparatus plasma processes the substrate in later chambers (items 34, Figure 1), this may imply that there is no heat resistance imparted to the *intermediate*

chamber substrate holding means. The structural characteristics of Shunpei Yamazaki's plasma assisted chemical vapor deposition apparatus (column 2, lines 13-21) is in many respects identical to the presently claimed apparatus. The primary difference between the presently claimed invention at that of Shunpei Yamazaki's plasma assisted chemical vapor deposition apparatus is the orientation of the device itself. The presently claimed invention has its long axis (processing direction vector) parallel to the gravity vector while the long axis (processing direction vector) of the Shunpei Yamazaki apparatus is perpendicular to the gravity vector. Specifically, Shunpei Yamazak describes *a substrate transfer section (item A, Figure 1), an intermediate chamber (item B, Figure 1), and a* final *processing chamber (item C, Figure 1). An intermediate chamber (item B, Figure 1),* supports *heat-resistant substrate holding means (item 70, Figure 1)* used in the intermediate processing chamber under a heated plasma process (column 5, lines 17-25; lines 55-59).

It is the examiner's position that a person of ordinary skill in the art at the time the invention was made would have found it obvious to enhance the Tateishi et al *intermediate chamber (item 24, Figure 1)* supporting *substrate holding means (item 40, Figure 1) positioned closer to* the *substrate transfer section (items 21, Figure 1) than* the *second substrate transfer means (item 42, Figure 1,2,3a,3b,4a,4b)* by employing heat-resistance as taught by Shunpei Yamazaki's plasma assisted chemical vapor deposition apparatus. Motivation for employing heat resistance to the *substrate holding means (item 40, Figure 1)* is drawn from the fact that plasma generating apparatus commonly operate at elevated temperatures.

Response to Arguments

October 3, 2000 arguments (paper 12B):

6. Item a:

Another thorough review of the cited references, in view of the stated positions, was conducted. It is noted that Tateishi et al does not describe a plurality of modules that are detachably attached to the substrate transfer section. To cure and solve this deficiency of Tateishi et al, Takagi is cited for:

a plurality of detachably (first paragraph, page 11*) attached modules* (items 14/2/3, Figure 1; certified STIC translation, pages 10-12) and *a plurality of modules* embodied by Mikio Takagi as *processing* or treatment *chambers* (items 2, Figure 1; certified STIC translation, pages 10-12) *for processing substrates*

7. Item b:

Applicant has, presumably, mis-interpreted the prior citation of the stated components:

xx. ***a substrate transfer section*** embodied by Tateishi et al here as item 52/53, Figure 4 (column 5, lines 40-55)

xxi. **a *substrate transfer section*** (items 52/53, Figure 2) *capable of transferring a substrate to the plurality of modules*

xxii. *a first valve (items 64, figure 2; 71, figure 6) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the processing chambers for processing substrates* (items 3, all Figures; column 1, lines 45-50) and ***a plurality of modules*** **embodied by Tateishi et al as *first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55)** *when the first valve is closed and allowing* a *substrate to pass through when opened*

xxiii. *a second valve (item 71, figure 4) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) and *a substrate transfer section* embodied by Tateishi et al here as item 52, Figure 2 (column 5, line 53) *when the second valve is closed and allowing* a *substrate to pass through when opened*

xxiv. *an intermediate chamber (item 52/53, Figure 2)* supporting *substrate holding means (items 65/72, Figure 4) positioned closer to* the *substrate transfer section (items 52, Figure 4) than* the *second substrate transfer means (item 78, Figure 4)*

Thus, it is within the scope of the Tateishi et al apparatus (Figure 4), where chambers 53-55 are "transfer modules" and chamber 52 is a "transfer section".

8. Item c:

With regards to the scope of a "*substrate transfer device*", the Examiner submits that the Tateishi et al elevators (62, 67, and 74; Figure 4) *are* substrate transfer devices. Item 67 being in the substrate transfer section.

9. Item d:

It is conceded that both Tepman and Tateishi et al each do not teach vertically arranging processing modules as claimed. However, under the previously stated motivation, *Takagi provides a teaching and motivation for* vertically arranging processing modules as claimed.

10. Item e:

It is believed that present and prior office actions clearly state the claimed subject matter with sufficient clarity for concise interpretation. As before:

xxv. *a plurality of modules* embodied here by Tateishi et al as ***processing chambers for processing substrates*** **(items *54***, Figure 4; column 5, lines 40-55) and *a plurality of modules* embodied by Tateishi et al as *first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) *for processing substrates*.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 305-3599. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Rudy Zervigon - RZ

January 15, 2001